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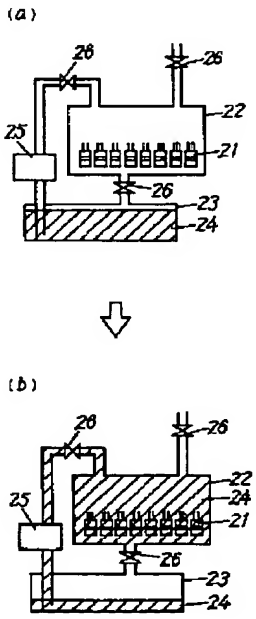
(54) IMPREGNATING METHOD WITH ELECTROLYTE TO CAPACITOR ELEMENT IN ALUMINUM ELECTROLYTIC CAPACITOR

(57) Abstract:

PURPOSE: To provide an impregnating method with an electrolyte to a capacitor element in an alumunum electrolytic capacitor capable of sufficiently impregnating into the inside of the capacitor element with the electrolyte in a short time.

CONSTITUTION: Capacitor elements 21 are dipped into an electrolyte 24 in an impregnating tank 22, the electrolyte 24 is further force-fed into the impregnating tank 22 under the dipped state, and pressure is applied to electrolyte 24 itself in the impregnating tank 22, thus applying the hydraulic pressure of the electrolyte 24 to the capacitor elements 21, then conducting pressure impregnation.



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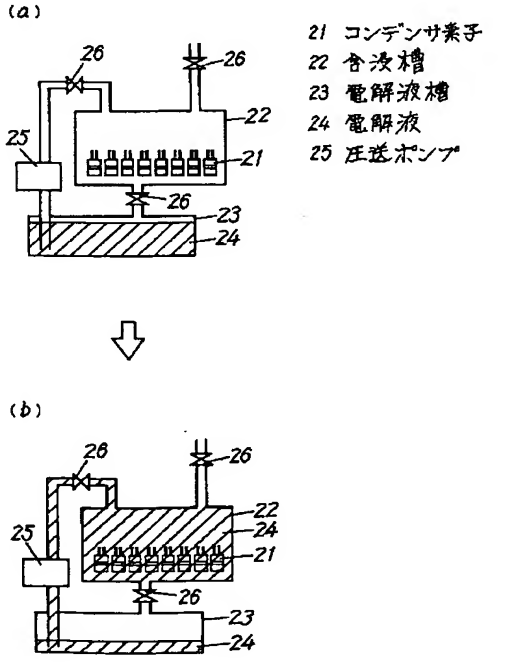
(54)【発明の名称】　アルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法

(57)【要約】

【目的】　短時間でコンデンサ素子の内部まで電解液を十分に含浸させることができるアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法を提供することを目的とする。

【構成】　コンデンサ素子２１を含浸槽２２内の電解液２４中に浸漬し、この浸漬状態でさらに前記含浸槽２２内に電解液２４を圧送して含浸槽２２内の電解液２４自体に圧力をかけることにより電解液２４の液圧をコンデンサ素子２１にかけて加圧含浸を行うようにしたものである。



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【特許請求の範囲】

【請求項１】　陽極箔と陰極箔とをその間にセパレータを介在させて巻回することにより構成されたコンデンサ素子を含浸槽内の電解液中に浸漬し、この浸漬状態でさらに前記含浸槽内に電解液を圧送して含浸槽内の電解液自体に圧力をかけることにより、電解液の液圧をコンデンサ素子にかけてコンデンサ素子への加圧含浸を行うようにしたアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法。

【請求項２】　陽極箔と陰極箔とをその間にセパレータを介在させて巻回することにより構成されたコンデンサ素子を含浸槽内に入れ、その後、含浸槽内を真空ポンプにより減圧することによりコンデンサ素子内の空気を抜き、さらにその後、前記含浸槽内に電解液を注入することによりコンデンサ素子に電解液を浸入させ、その後、さらに前記含浸槽内に電解液を圧送して含浸槽内の電解液自体に圧力をかけることにより電解液の液圧をコンデンサ素子にかけてコンデンサ素子への加圧含浸を行うようにしたアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、各種電子機器に利用されるアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法に関するものである。

【０００２】

【従来の技術】従来においては、この種のアルミ電解コンデンサにおいてコンデンサ素子へ電解液を含浸させる場合、その設備構造を図４（ａ）（ｂ）にプロセス順に示すような方法により行っていた。すなわち、図４（ａ）に示すように、まず、陽極箔と陰極箔とをその間にセパレータを介在させて巻回することにより構成されたコンデンサ素子１を含浸槽２内に入れ、そして真空ポンプ３により前記含浸槽２内を５３００Ｐａ（約４０㎜Ｈｇ）以下に減圧する。次いで図４（ｂ）に示すように、電解液槽４から電解液５を前記含浸槽２内に注入し、その後、前記含浸槽２内を大気圧に開放するという真空含浸工法により、コンデンサ素子１への電解液５の含浸を行っていた。なお、この図４（ａ）（ｂ）において、６は開閉バルブである。

【０００３】しかしながら、この真空含浸工法は、コンデンサ素子１の内部に十分に電解液５を含浸させようとした場合、真空含浸を行った後、電解液５中にコンデンサ素子１を浸漬したまま長時間放置する必要があるため、電解コンデンサの生産性を著しく低下させるものであった。また、コンデンサ素子１の寸法が大きい場合には、含浸不足となって静電容量やｔａｎδ（誘電損失）等の電気特性に悪影響を及ぼすという問題点も有していた。

【０００４】そして従来においては、これらの問題点を

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改善するために、図５（ａ）（ｂ）（ｃ）に順に示すような別の方法により、コンデンサ素子への電解液の含浸を行っていた。すなわち、図５（ａ）に示すように、まず、陽極箔と陰極箔とをその間にセパレータを介在させて巻回することにより構成されたコンデンサ素子７を含浸槽８内に入れ、そして真空ポンプ９により前記含浸槽８内を５３００Ｐａ（約４０㎜Ｈｇ）以下に減圧する。次いで図５（ｂ）に示すように、電解液槽１０より電解液１１を前記含浸槽８内に注入し、その後、前記含浸槽８内を大気圧に開放するという真空含浸を行う。そしてこの真空含浸の後、図５（ｃ）に示すように、電解液１１中にコンデンサ素子７を浸漬した状態で含浸槽８内の空隙部１２にコンプレッサー１３により空気を注入し、前記電解液１１に１．５×１０^{5}～５×１０^{5}Ｐａ（約１．５～５ｋｇｆ／㎠）程度の空気による加圧を行うことにより、コンデンサ素子７の内部に電解液１１を含浸させるという加圧含浸工法により、コンデンサ素子７への電解液１１の含浸を行っていた。なお、この図５（ａ）（ｂ）（ｃ）において、１４は開閉バルブである。

【０００５】

【発明が解決しようとする課題】しかしながら、図５（ａ）（ｂ）（ｃ）に示すような真空含浸工法と加圧含浸工法とを組み合わせたものにおいても、コンデンサ素子７の内部に十分に電解液１１を含浸させようとした場合、真空含浸工法のみで行っているものと比較して短時間ではあるが、電解液１１中にコンデンサ素子７を浸漬したまま放置するという放置時間が必要であり、この場合も、図４（ａ）（ｂ）に示す真空含浸工法のみで行っているものと同じように電解コンデンサの生産性を低下させるという問題点を有していた。また、コンデンサ素子７の寸法が大きい場合には、図４（ａ）（ｂ）に示す真空含浸工法のみで行っているものと比較して良化はしているが、まだ含浸不足となることがあり、これが静電容量やｔａｎδ等の電気特性に悪影響を及ぼすという問題点となっていた。

【０００６】これらの問題点を解決しようとした場合、前記空気による加圧力を数十倍から数百倍の超高気圧まで上昇させる必要があるが、この空気を用いる加圧は、空気の収縮率が非常に大きいため、コンプレッサー１３自体も大きなものが必要となり、またその収縮に伴う含浸槽８の壁への圧迫に耐え得る含浸槽８が必要となるため、設備的に複雑となるだけでなく、コスト的にも非常に不利となるものであった。

【０００７】本発明は上記従来の問題点を解決するもので、設備的に複雑になることなく、短時間でコンデンサ素子の内部まで電解液を十分に含浸させることができるアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法を提供することを目的とするものである。

【０００８】

【課題を解決するための手段】上記目的を達成するために本発明のアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法は、陽極箔と陰極箔とをその間にセパレータを介在させて巻回することにより構成されたコンデンサ素子を含浸槽内の電解液中に浸漬し、この浸漬状態でさらに前記含浸槽内に電解液を圧送して含浸槽内の電解液自体に圧力をかけることにより、電解液の液圧をコンデンサ素子にかけてコンデンサ素子への加圧含浸を行うようにしたものである。

【０００９】

【作用】上記含浸方法によれば、コンデンサ素子を含浸槽内の電解液中に浸漬した状態でさらに含浸槽内に電解液を圧送して含浸槽内の電解液自体に圧力をかけることにより電解液の液圧をコンデンサ素子にかけてコンデンサ素子への加圧含浸を行うようにしているもので、この電解液の液圧は、従来の空気圧による加圧〔１．５×１０^5～５×１０^{5}Ｐａ（約１．５～５kgｆ／cm^2）〕と比較して、気体より収縮率が桁違いに小さい液体を加圧するため、従来の空気圧による加圧のように設備的に複雑になることはなく、コスト的にも非常に有利となり、しかも前記電解液の液圧は、従来の空気圧による加圧の数倍から数百倍の圧力〔１０×１０^5～５００×１０^{5}Ｐａ（約１０～５００kgｆ／cm^2）〕をかけることができるため、短時間でコンデンサ素子の内部にまで十分に電解液を含浸させることができ、これにより、含浸不足による静電容量やｔａｎδ等の電気特性への悪影響ということもなくなるものである。

【００１０】

【実施例】以下、本発明の実施例を添付図面にもとづいて説明する。図１（ａ）（ｂ）は本発明の一実施例をプロセス順に示したものである。この一実施例は、図１（ａ）に示すように、まず、陽極箔と陰極箔とをその間にセパレータを介在させて巻回することにより構成されたコンデンサ素子２１を含浸槽２２内に入れ、次いで図１（ｂ）に示すように、電解液槽２３より電解液２４を前記含浸槽２２内に圧送ポンプ２５により注入して含浸槽２２内を満たすことにより、コンデンサ素子２１を電解液２４中に浸漬する。この浸漬状態でさらに圧送ポンプ２５により前記含浸槽２２内に電解液槽２３内の電解液２４を圧送して含浸槽２２内の電解液２４自体に、〔１０×１０^5～５００×１０^{5}Ｐａ（約１０～５００kgｆ／cm^2）〕の圧力をかけることにより、コンデンサ素子２１には、この電解液２４の液圧、すなわち〔１０×１０^5～５００×１０^{5}Ｐａ（約１０～５００kgｆ／cm^2）〕の液圧がかかるもので、この液圧がかかることにより、コンデンサ素子２１内の空気がその液圧力により放出されると同時に、前記電解液２４がコンデンサ素子２１の内部に含浸されるものである。なお、この図１（ａ）（ｂ）において、２６は開閉バルブである。

【００１１】このように本発明の一実施例によれば、コンデンサ素子２１を含浸槽２２内の電解液２４中に浸漬した状態でさらに含浸槽２２内に圧送ポンプ２５により電解液槽２３内の電解液２４を圧送して含浸槽２２内の電解液２４自体に圧力をかけることにより電解液２４の液圧をコンデンサ素子２１にかけてコンデンサ素子２１への加圧含浸を行うようにしているもので、前記電解液２４の液圧は、従来の空気圧による加圧と比較して、気体より収縮率が桁違いに小さい液体を加圧するため、従来の空気圧による加圧のように設備的に複雑になることはなく、コスト的にも非常に有利となるものである。また前記電解液２４の液圧は、従来の空気圧による加圧の数倍から数百倍の圧力〔１０×１０^5～５００×１０^{5}Ｐａ（約１０～５００kgｆ／cm^2）〕をかけることができるため、短時間でコンデンサ素子２１の内部にまで十分に電解液２４を含浸させることができ、これにより、含浸不足による静電容量やｔａｎδ等の電気特性への悪影響も防止することができるものである。

【００１２】図２（ａ）（ｂ）（ｃ）は本発明の他の実施例を工程順に示したもので、前述した本発明の一実施例と同一部品については同一番号を付して説明する。この他の実施例は、図２（ａ）に示すように、まず、陽極箔と陰極箔とをその間にセパレータを介在させて巻回することにより構成されたコンデンサ素子２１を含浸槽２２内に入れ、その後、含浸槽２２内を真空ポンプ２７により５３００Ｐａ（約４０mmＨｇ）以下に減圧することによりコンデンサ素子２１内の空気を抜く。次いで図２（ｂ）に示すように電解液槽２３より電解液２４を前記含浸槽２２内に圧送ポンプ２５により注入し、前記コンデンサ素子２１に電解液２４を保持させる。その後、一旦前記含浸槽２２内を大気圧に開放し、そして含浸槽２２内の上部に位置する空隙部２８に圧送ポンプ２５により電解液槽２３内の電解液２４を注入して含浸槽２２内を電解液２４で満たし、その後、この状態から図２（ｃ）に示すようにさらに圧送ポンプ２５により前記含浸槽２２内に電解液槽２３内の電解液２４を圧送して含浸槽２２内の電解液２４自体に、〔１０×１０^5～５００×１０^{5}Ｐａ（約１０～５００kgｆ／cm^2）〕の圧力をかけることにより、コンデンサ素子２１には、この電解液２４の液圧、すなわち〔１０×１０^5～５００×１０^{5}Ｐａ（約１０～５００kgｆ／cm^2）〕の液圧がかかることにより、コンデンサ素子２１に保持させた電解液２４がコンデンサ素子２１の内部まで瞬時に含浸されるものである。

【００１３】このように本発明の他の実施例によれば、含浸槽２２内に圧送ポンプ２５により電解液槽２３内の電解液２４を圧送して含浸槽２２内の電解液２４自体に圧力をかけることにより電解液２４の液圧をコンデンサ素子２１にかけてコンデンサ素子２１への加圧含浸を行う前に、コンデンサ素子２１を入れた含浸槽２２内を真空ポンプ２７により５３００Ｐａ（約４０mmＨｇ）以下

に減圧することによりコンデンサ素子２１内の空気を抜くようにしているため、前述した電解液２４の液圧をコンデンサ素子２１にかけてコンデンサ素子２１への加圧含浸を行う場合、より短時間でコンデンサ素子２１に保持させた電解液２４をコンデンサ素子２１の内部にまで含浸させることができるという優れた効果を有するものである。

【００１４】図３は図２（ａ）（ｂ）（ｃ）で示した本発明の他の実施例の含浸方法と、図５（ａ）（ｂ）（ｃ）で示した従来例の含浸方法を用いて、定格１６０Ｖ２７０００μＦ，寸法φ９０×Ｌ１５０のコンデンサ素子に電解液を含浸させた場合における、これらのコンデンサの、その後の放置工程における放置時間に対する静電容量とｔａｎδの変化について示したものである。

【００１５】この図３から明らかなように、本発明の他の実施例の場合は、電解液の液圧による加圧含浸を行っているため、従来例の空気圧による加圧含浸に比べて、含浸後の放置時間も著しく少なくでき、かつ静電容量も若干高く、さらにｔａｎδも小さいもので、この事は、電解液がコンデンサ素子の内部にまで十分に含浸されていることを示すものである。

【００１６】

【発明の効果】以上のように本発明のアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法は、コンデンサ素子を含浸槽内の電解液中に浸漬した状態でさらに含浸槽内に電解液を圧送して含浸槽内の電解液自体に圧力をかけることにより電解液の液圧をコンデンサ素子にかけてコンデンサ素子への加圧含浸を行うようにしているもので、この電解液の液圧は、従来の空気圧による加圧〔１．５×１０⁵～５×１０⁵Ｐａ（約１．５～＊５ｋｇｆ／ｃｍ²）〕と比較して、液体の収縮率がもともと小さいため、従来の空気圧による加圧のように設備的に複雑になることはなく、コスト的にも非常に有利となり、しかも前記電解液の液圧は、従来の空気圧による加圧の数倍から数百倍の圧力〔１０×１０⁵～５００×１０⁵Ｐａ（約１０～５００ｋｇｆ／ｃｍ²）〕をかけることができるため、短時間でコンデンサ素子の内部にまで十分に電解液を含浸させることができ、これにより、含浸不足による静電容量やｔａｎδ等の電気特性への悪影響ということもなくなるものである。

【図面の簡単な説明】

【図１】本発明のアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法の一実施例を順に示す工程図

【図２】本発明の電解液の含浸方法の他の実施例を順に示す工程図

【図３】本発明の他の実施例の含浸方法と、従来例の含浸方法を用いて、電解液を含浸させた場合の放置時間に対する静電容量とｔａｎδの変化の特性図

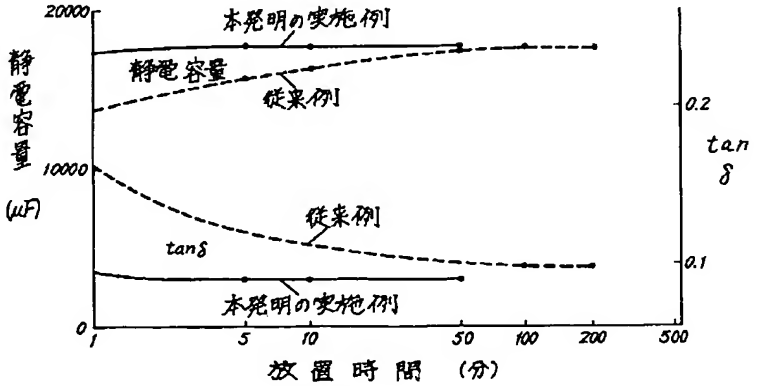
【図４】従来のアルミ電解コンデンサにおけるコンデンサ素子への電解液の含浸方法の一例を順に示す工程図

【図５】従来の電解液の含浸方法の他の例を順に示す工程図

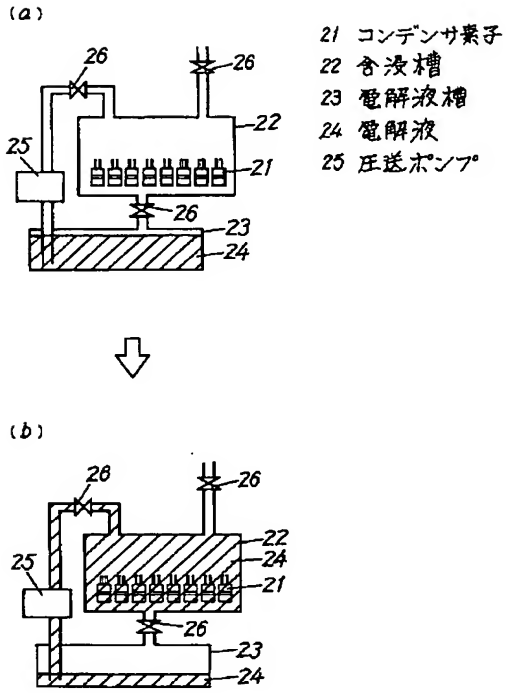
【符号の説明】

２１　コンデンサ素子
２２　含浸槽
２３　電解液槽
２４　電解液
２５　圧送ポンプ
２７　真空ポンプ

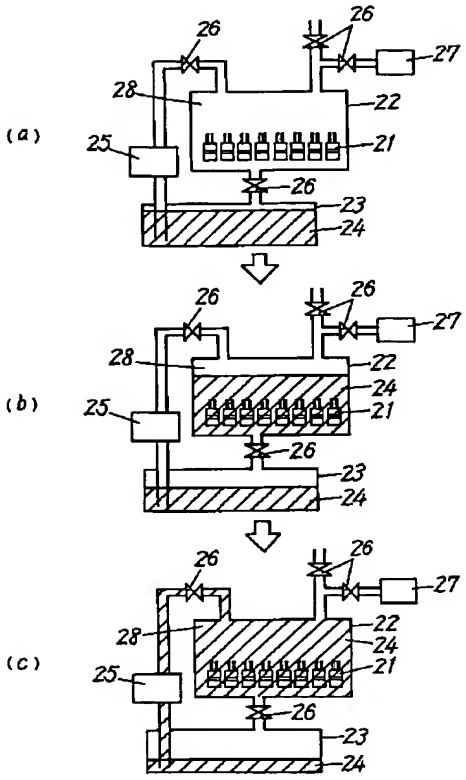
【図３】



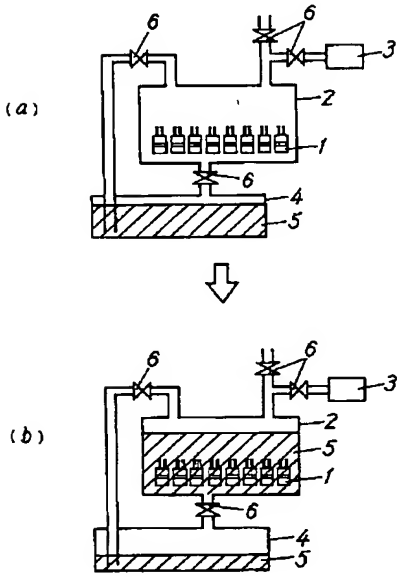
【図１】


(a)
21 コンデンサ素子
22 含浸槽
23 電解液槽
24 電解液
25 圧送ポンプ
26
(b)

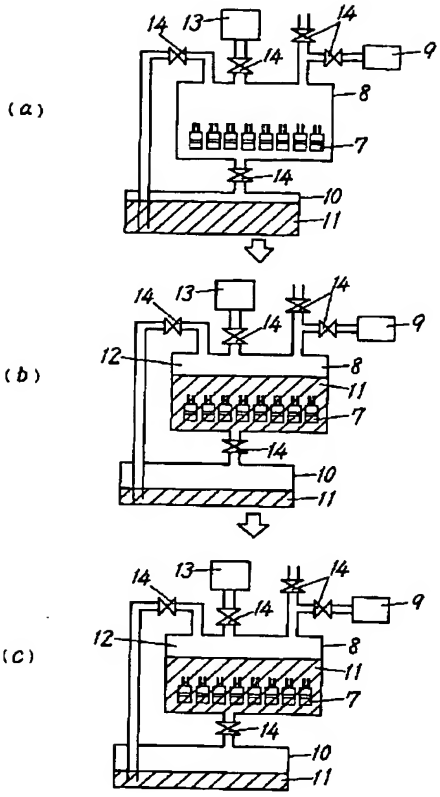
【図２】


(a)
(b)
(c)
26
27
28
22
21
23
24
25

【図４】


(a)
(b)
6
3
2
1
4
5

【図５】



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(54) IMPREGNATING METHOD WITH ELECTROLYTE TO CAPACITOR ELEMENT IN ALUMINUM ELECTROLYTIC CAPACITOR

(57)Abstract:
PURPOSE: To provide an impregnating method with an electrolyte to a capacitor element in an alumunum electrolytic capacitor capable of sufficiently impregnating into the inside of the capacitor element with the electrolyte in a short time.
CONSTITUTION: Capacitor elements 21 are dipped into an electrolyte 24 in an impregnating tank 22, the electrolyte 24 is further force-fed into the impregnating tank 22 under the dipped state, and pressure is applied to electrolyte 24 itself in the impregnating tank 22, thus applying the hydraulic pressure of the electrolyte 24 to the capacitor elements 21, then conducting pressure impregnation.

CLAIMS

[Claim(s)]
[Claim 1]The sinking-in approach of the electrolytic solution to the capacitor element in the aluminium electrolytic condenser which was made to perform pressurization sinking in to a capacitor element by immersing the capacitor element constituted by making a separator intervene and winding an anode plate foil and a cathode foil between them into the electrolytic solution in a sinking-in tub, feeding the electrolytic solution and putting a pressure in said sinking-in tub further in the state of this immersion at the electrolytic solution in a sinking-in tub itself, applying the fluid pressure of the electrolytic solution to a capacitor element.
[Claim 2]The capacitor element constituted by making a separator intervene and winding an anode plate foil and a cathode foil between them is put in in a sinking-in tub. Then, the air in a capacitor element is extracted by decompressing the inside of a sinking-in tub with a vacuum pump. The electrolytic solution is made to infiltrate into a capacitor element by furthermore pouring in the electrolytic solution into said sinking-in tub after that. Then, the sinking-in approach of the electrolytic solution to the capacitor element in the aluminium electrolytic condenser which was made to perform pressurization sinking in to a capacitor element by feeding the electrolytic solution and putting a pressure in said sinking-in tub further at the electrolytic solution in a sinking-in tub itself, applying the fluid pressure of the electrolytic solution to a capacitor element.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the sinking-in approach of the electrolytic solution to the capacitor element in the aluminium electrolytic condenser used for various electronic equipment.
[0002]
[Description of the Prior Art]In the former, when the electrolytic solution was infiltrated to a capacitor element in this kind of aluminium electrolytic condenser, it was carrying out by the approach that that facility structure is shown in drawing 4 (a) and (b) in order of a process. That is, as shown in drawing 4 (a), the capacitor element 1 constituted by making a separator intervene and winding an anode plate foil and a cathode foil between them first is put in in the sinking-in tub 2, and the inside of said sinking-in tub 2 is decompressed below to 5300Pa (about 40 mmHg(s)) with a vacuum pump 3. Subsequently, as shown in drawing 4 (b), the electrolytic solution 5 was poured in into said sinking-in tub 2 from the electrolytic-solution tub 4, and the electrolytic solution 5 to a capacitor element 1 was sunk in with the vacuum impregnation method of construction of opening the inside of said sinking-in tub 2 to an atmospheric pressure after that. In addition, in this drawing 4 (a) and (b), 6 is a closing motion bulb.
[0003]However, since this vacuum impregnation method of construction needed to carry out long duration neglect while it had been immersed in the capacitor element 1 into the electrolytic solution 5 after it performs vacuum impregnation when it is fully going to infiltrate the electrolytic solution 5 into the interior of a capacitor element 1, it was that to which the productivity of an electrolytic capacitor is reduced remarkably. Moreover, when the dimension of a capacitor element 1 was large, it also had the trouble of it having become insufficient sinking in and having a bad influence on electrical properties, such

as electrostatic capacity and tandelta (dielectric loss).
[0004]And in the former, in order to improve these troubles, the electrolytic solution to a capacitor element was sunk in by the option as shown in drawing 5 (a), (b), and (c) in order. That is, as shown in drawing 5 (a), the capacitor element 7 constituted by making a separator intervene and winding an anode plate foil and a cathode foil between them first is put in in the sinking-in tub 8, and the inside of said sinking-in tub 8 is decompressed below to 5300Pa (about 40 mmHg(s)) with a vacuum pump 9. Subsequently, as shown in drawing 5 (b), the electrolytic solution 11 is poured in into said sinking-in tub 8 from the electrolytic-solution tub 10, and vacuum impregnation of opening the inside of said sinking-in tub 8 to atmospheric pressure after that is performed. And as shown in drawing 5 (c) after this vacuum impregnation, air is poured into the opening section 12 in the sinking-in tub 8 by the compressor 13 in the condition that the capacitor element 7 was immersed into the electrolytic solution 11. By performing pressurization with the air of 1.5x105 to 5x105Pa (about 1.5 to 5 kgf/cm2) extent to said electrolytic solution 11, the electrolytic solution 11 to a capacitor element 7 was sunk in with the pressurization sinking-in method of construction of infiltrating the electrolytic solution 11 into the interior of a capacitor element 7. In addition, in this drawing 5 (a), (b), and (c), 14 is a closing motion bulb.
[0005]
[Problem(s) to be Solved by the Invention]However, although it is a short time as compared with what is being performed only by the vacuum impregnation method of construction also in what combined the vacuum impregnation method of construction as shown in drawing 5 (a), (b), and (c), and the pressurization sinking-in method of construction when it is fully going to infiltrate the electrolytic solution 11 into the interior of a capacitor element 7It had the trouble of reducing the productivity of an electrolytic capacitor like [the neglect time amount of leaving it while the capacitor element 7 had been immersed into the electrolytic solution 11 is required, and] what is being performed only by the vacuum impregnation method of construction shown in drawing 4 (a) and (b) also in this case. Moreover, although improvement was carried out as compared with what is being performed only by the vacuum impregnation method of construction shown in drawing 4 (a) and (b) when the dimension of a capacitor element 7 was large, it may become still insufficient sinking in and it had become the trouble that this had a bad influence on electrical properties, such as electrostatic capacity and tandelta.
[0006]Although it is necessary from a number decade to one hundreds times the super-high pressure of this to raise welding pressure with said air when it is going to solve these troublesSince the sinking-in tub 8 which what also has compressor 13 big the very thing is needed, and can be equal to the pressure to the wall of the sinking-in tub 8 accompanying that contraction since the pressurization using this air has very large contraction of air is needed, It not only becomes complicated in facility, but it was what becomes very [in cost] disadvantageous.
[0007]It aims at offering the sinking-in approach of the electrolytic solution to the capacitor element in the aluminium electrolytic condenser into which the electrolytic solution can fully be infiltrated to the interior of a capacitor element for a short time, without this invention's solving the above-mentioned conventional trouble, and becoming complicated in facility.
[0008]
[Means for Solving the Problem]In order to attain the above-mentioned purpose, the sinking-in approach of the electrolytic solution to the capacitor element in the aluminium electrolytic condenser of this inventionThe capacitor element constituted by making a separator intervene and winding an anode plate foil and a cathode foil between them is immersed into the electrolytic solution in a sinking-in tub. It is made to perform pressurization sinking in to a capacitor element by feeding the electrolytic solution and putting a pressure in said sinking-in tub, further, in the state of this immersion, at the electrolytic

solution in a sinking-in tub itself, applying the fluid pressure of the electrolytic solution to a capacitor element.

[0009]

[Function]It is what is made. to perform pressurization sinking in to a capacitor element by according to the above-mentioned sinking-in approach feeding the electrolytic solution in a sinking-in tub further in the condition that the capacitor element was immersed into the electrolytic solution in a sinking-in tub, and putting a pressure on the electrolytic solution in a sinking-in tub itself, applying the fluid pressure of the electrolytic solution to a capacitor element. In order that, as for the fluid pressure of this electrolytic solution, contraction may pressurize an extraordinarily small liquid from a gas as compared with the pressurization [1.5x105 to 5x105Pa (about 1.5 to 5 kgf/cm2)] by the conventional pneumatic pressure, It does not become complicated in facility like the pressurization by the conventional pneumatic pressure, and becomes very [in cost] advantageous. Moreover, the fluid pressure of said electrolytic solutionSince one [10x105 to 500x105Pa (about ten to 500 kgf/cm2)] hundreds times [several to] the pressure of the pressurization by the conventional pneumatic pressure of this can be applied, The electrolytic solution can fully be infiltrated even into the interior of a capacitor element for a short time, and, thereby, the bad influence to electrical properties by the lack of sinking in, such as electrostatic capacity and tandelta, is also lost.

[0010]

[Example]Hereafter, the example of this invention is explained based on an accompanying drawing. Drawing 1 (a) and (b) show one example of this invention in order of a process. This one example so that the capacitor element 21 constituted by making a separator intervene and winding an anode plate foil and a cathode foil between them first as shown in drawing 1 (a) may be put in in the sinking-in tub 22 and may be shown subsequently to drawing 1 R> 1 (b)By pouring in the electrolytic solution 24 with the feeding pump 25 into said sinking-in tub 22, and filling the inside of the sinking-in tub 22 from the electrolytic-solution tub 23, a capacitor element 21 is immersed into the electrolytic solution 24. The electrolytic solution 24 in the electrolytic-solution tub 23 is further fed in said sinking-in tub 22 with the feeding pump 25 in the state of this immersion. To electrolytic-solution 24 the very thing in the sinking-in tub 22By putting the pressure of [10x105 to 500x105Pa (about ten to 500 kgf/cm2)], to a capacitor element 21It is what requires the fluid pressure of this electrolytic solution 24, i.e., the fluid pressure of [10x105 to 500x105Pa (about ten to 500 kgf/cm2)]. Said electrolytic solution 24 sinks into the interior of a capacitor element 21 at the same time the air in a capacitor element 21 is emitted by that fluid pressure force, when this fluid pressure starts. In addition, in this drawing 1 (a) and (b), 26 is a closing motion bulb.

[0011]Thus, according to one example of this inventionFurther a capacitor element 21 in the sinking-in tub 22 in the condition of having been immersed into the electrolytic solution 24 in the sinking-in tub 22 with the feeding pump 25It is what is made to perform pressurization sinking in to a capacitor element 21 by feeding the electrolytic solution 24 in the electrolytic-solution tub 23, and putting a pressure on electrolytic-solution 24 the very thing in the sinking-in tub 22, applying the fluid pressure of the electrolytic solution 24 to a capacitor element 21. In order that contraction may pressurize an extraordinarily small liquid from a gas as compared with the pressurization by the conventional pneumatic pressure, the fluid pressure of said electrolytic solution 24 does not become complicated in facility like the pressurization by the conventional pneumatic pressure, and becomes very [in cost] advantageous. Moreover, since the fluid pressure of said electrolytic solution 24 can apply one [10x105 to 500x105Pa (about ten to 500 kgf/cm2)] hundreds times [several to] the pressure of the pressurization by the conventional pneumatic pressure of this, it can fully infiltrate the electrolytic solution 24 even into the interior of a capacitor element 21 in a short time, and, thereby, can also prevent the bad

influence to electrical properties by the lack of sinking in, such as electrostatic capacity and tandelta.

[0012]Drawing 2 (a), (b), and (c) are what showed other examples of this invention in order of the process, and attach and explain the same number about the same components as one example of this invention mentioned above. As shown in drawing 2 (a), other examples put in the capacitor element 21 constituted by making a separator intervene and winding an anode plate foil and a cathode foil between them first in the sinking-in tub 22, and extract the air in a capacitor element 21 by decompressing the inside of the sinking-in tub 22 below to 5300Pa (about 40 mmHg(s)) with a vacuum pump 27 after that. Subsequently, as shown in drawing 2 (b), the electrolytic solution 24 is poured in with the feeding pump 25 into said sinking-in tub 22 from the electrolytic-solution tub 23, and the electrolytic solution 24 is made to hold to said capacitor element 21. Then, once open the inside of said sinking-in tub 22 wide to atmospheric pressure, pour the electrolytic solution 24 in the electrolytic-solution tub 23 into the opening section 28 located in the upper part in the sinking-in tub 22 with the feeding pump 25, and the inside of the sinking-in tub 22 is filled with the electrolytic solution 24. As shown in drawing 2 (c) from this condition, the electrolytic solution 24 in the electrolytic-solution tub 23 is further fed in said sinking-in tub 22 with the feeding pump 25. Then, to electrolytic-solution 24 the very thing in the sinking-in tub 22By putting the pressure of [10x105 to 500x105Pa (about ten to 500 kgf/cm2)], to a capacitor element 21When the fluid pressure of this electrolytic solution 24, i.e., the fluid pressure of [10x105 to 500x105Pa (about ten to 500 kgf/cm2)], starts, the electrolytic solution 24 made to hold to a capacitor element 21 sinks in to the interior of a capacitor element 21 in an instant.

[0013]Thus, according to other examples of this inventionBefore performing pressurization sinking in to a capacitor element 21 by feeding the electrolytic solution 24 in the electrolytic-solution tub 23 with the feeding pump 25, and putting a pressure in the sinking-in tub 22 at electrolytic-solution 24 the very thing in the sinking-in tub 22, applying the fluid pressure of the electrolytic solution 24 to a capacitor element 21Since he is trying to extract the air in a capacitor element 21 by decompressing the inside of the sinking-in tub 22 which put in the capacitor element 21 below to 5300Pa (about 40 mmHg(s)) with a vacuum pump 27, When performing pressurization sinking in to a capacitor element 21, applying the fluid pressure of the electrolytic solution 24 mentioned above to a capacitor element 21, it has the outstanding effectiveness that the electrolytic solution 24 made to hold to a capacitor element 21 more for a short time can be infiltrated even into the interior of a capacitor element 21.

[0014]Drawing 3 shows the change of the electrostatic capacity and tandelta to neglect time amount in the subsequent neglect process of these capacitors at the time of infiltrating the electrolytic solution into rated 160V27000micro F and the capacitor element of dimension phi90xL150 using the sinking-in approach of other examples of this invention shown by drawing 2 (a), (b), and (c), and the sinking-in approach of the conventional example shown by drawing 5 (a), (b), and (c).

[0015]It is shown that can also lessen neglect time amount after sinking in remarkable compared with according to pneumatic pressure of conventional example since it is performing according [the case of the example of everything but this invention] to fluid pressure of the electrolytic solution so that clearly from this drawing 3 pressurization sinking in pressurization sinking in, and electrostatic capacity is also high a little, tandelta is also still smaller, and this thing fully sinks even into the interior of a capacitor element in the electrolytic solution.

[0016]

[Effect of the Invention]The sinking-in approach of the electrolytic solution to the capacitor element in the aluminium electrolytic condenser of this invention as mentioned aboveIt is what is made to perform pressurization sinking in to a capacitor element by feeding the electrolytic solution in a sinking-in tub

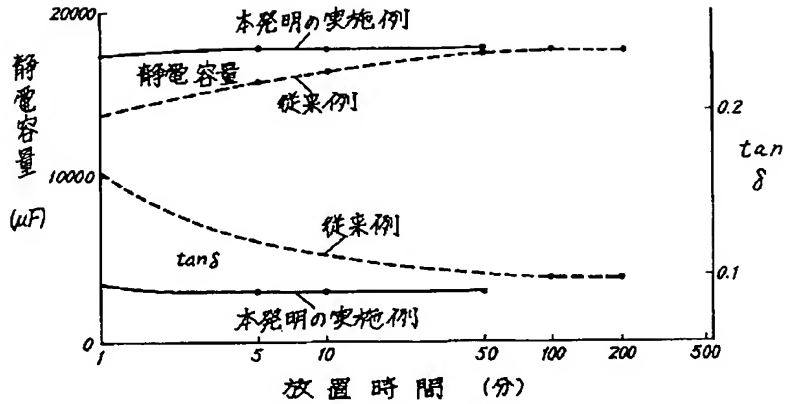
further in the condition that the capacitor element was immersed into the electrolytic solution in a sinking-in tub, and putting a pressure on the electrolytic solution in a sinking-in tub itself, applying the fluid pressure of the electrolytic solution to a capacitor element. The fluid pressure of this electrolytic solutionIt compares with the pressurization [1.5x105 to 5x105Pa (about 1.5 to 5 kgf/cm2)] by the conventional pneumatic pressure. Since contraction of a liquid is small from the first, It does not become complicated in facility like the pressurization by the conventional pneumatic pressure, and becomes very [in cost] advantageous. Moreover, the fluid pressure of said electrolytic solutionSince one [10x105 to 500x105Pa (about ten to 500 kgf/cm2)] hundreds times [several to] the pressure of the pressurization by the conventional pneumatic pressure of this can be applied, The electrolytic solution can fully be infiltrated even into the interior of a capacitor element for a short time, and, thereby, the bad influence to electrical properties by the lack of sinking in, such as electrostatic capacity and tandelta, is also lost.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]Process drawing showing one example of the sinking-in approach of the electrolytic solution to the capacitor element in the aluminium electrolytic condenser of this invention in order
[Drawing 2]Process drawing showing other examples of the sinking-in approach of the electrolytic solution of this invention in order
[Drawing 3]The property Fig. of change of electrostatic capacity and tandelta to the neglect time amount at the time of infiltrating the electrolytic solution using the sinking-in approach of other examples of this invention, and the sinking-in approach of the conventional example
[Drawing 4]Process drawing showing an example of the sinking-in approach of the electrolytic solution to the capacitor element in the conventional aluminium electrolytic condenser in order
[Drawing 5]Process drawing showing other examples of the sinking-in approach of the conventional electrolytic solution in order
[Description of Notations]
21 Capacitor Element
22 Sinking-in Tub
23 Electrolytic-Solution Tub
24 Electrolytic Solution
25 Feeding Pump
27 Vacuum Pump

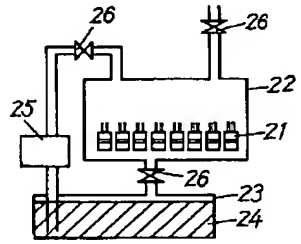
DRAWINGS

[Drawing 3]



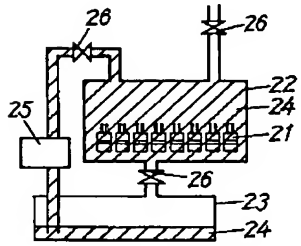
[Drawing 1]

(a)

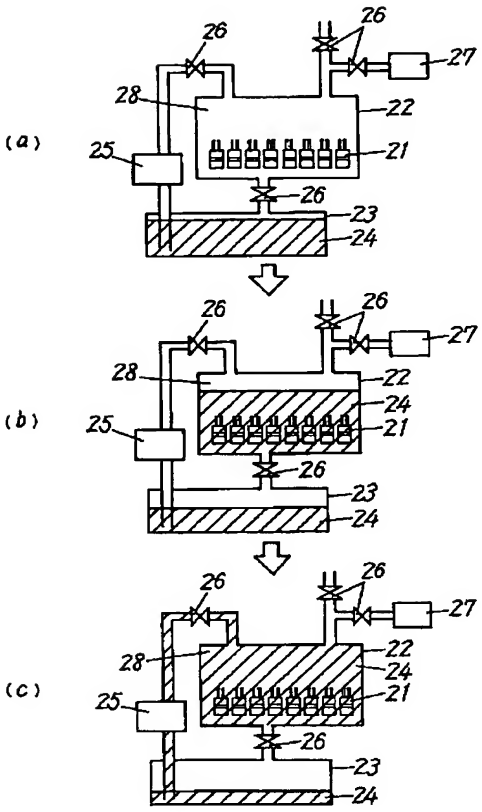


21 コンデンサ素子
22 含浸槽
23 電解液槽
24 電解液
25 圧送ポンプ

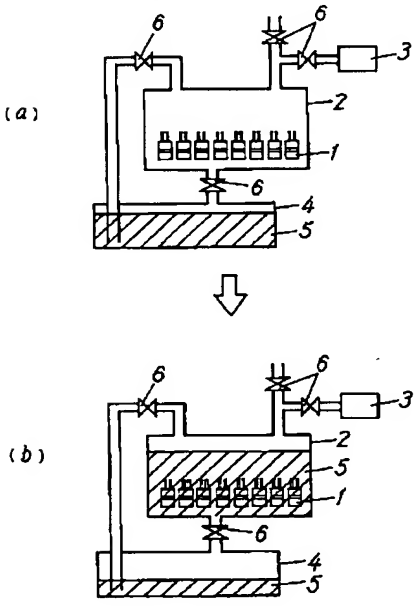
(b)



[Drawing 2]

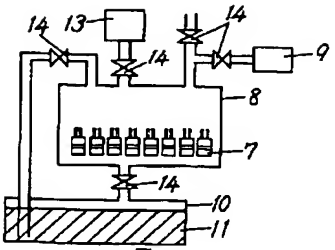


[Drawing 4]



[Drawing 5]

(a)


14
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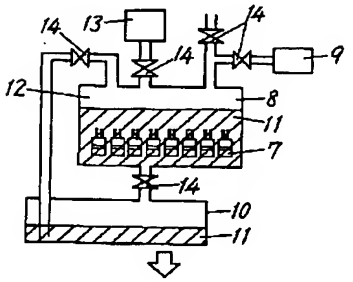
(b)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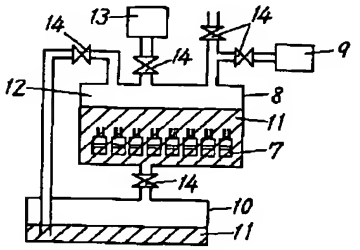
(c)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